

## Air conditioner

**Publication number:** CN1403748

**Publication date:** 2003-03-19

**Inventor:** NOBUYUKI TAKETANI (JP); TETSUO OZAWA (JP); KOJI NIGITA (JP)

**Applicant:** TOSHIBA CARRIER CORP (JP)

**Classification:**

- international: F24F1/00; F24F3/06; F24F11/02; F24F13/00;  
F24F13/16; F24F1/00; F24F3/06; F24F11/02;  
F24F13/00; F24F13/10; (IPC1-7): F24F3/06; F24F13/00

- European:

**Application number:** CN20021031992 20020828

**Priority number(s):** JP20010258463 20010828

**Also published as:**

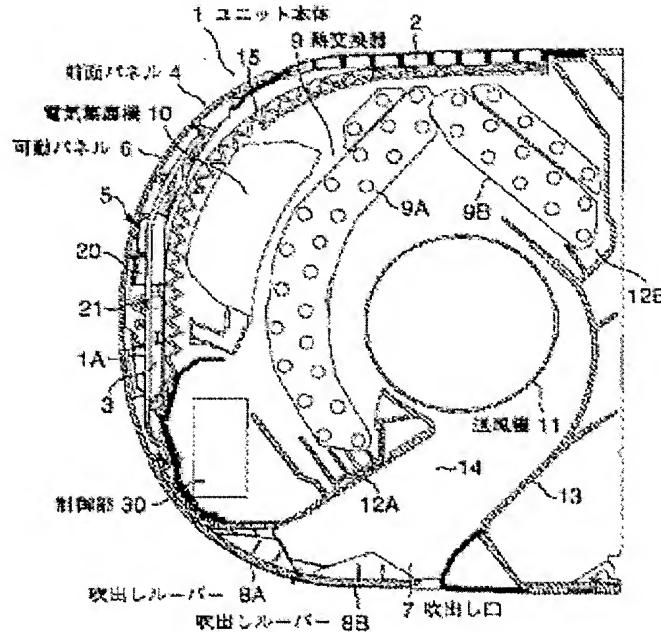
JP2003074897 (A)  
CN1176325C (C)

[Report a data error here](#)

Abstract not available for CN1403748

Abstract of corresponding document: [JP2003074897](#)

**PROBLEM TO BE SOLVED:** To provide an air conditioner which enables an optimum shape structure for an approximate reverse V-shaped heat exchanger and a front face part of a main body, securement of an amount of airflow of heat exchanged air, reduction of residence area of suction airflow into the heat exchanger, reduction of leakage of operation noise from the front face part, and improvement of short circuit property. **SOLUTION:** The front face part of the unit main body 1 is provided with a suction opening 3, and the rearward of the lower part of this main body is provided with a blowoff outlet 7. A front panel 4 which is formed into curvature in a side view to cover the suction opening and which is formed into a completely even and smooth curved surface is installed. The heat exchanger 9 is arranged into the approximate reverse V shape with a front heat exchanger part 9A formed into curvature in a side view in a face-to-face position with the suction opening and a straight rear heat exchanger part 9B. A blower 11 is arranged between the front and rear heat exchanger parts. An electric dust collector 10 capable of switching dust collecting operation and ozone generating operation is arranged between the suction opening and the heat exchanger. The front panel is equipped with a movable panel 6 which protrudes in normal air conditioning operation and in drying operation of the inside of the main body to open the suction opening and which closes the suction opening in discontinuation of the operation and in sterilizing operation of the inside of the main body.



**\* NOTICES \***

JP0 and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**CLAIMS**

---

[Claim(s)]

[Claim 1]An air conditioner comprising:

An air conditioner body.

An exit cone provided in a back position rather than a suction opening in a suction opening provided in the front part of this air conditioner body, and the lower part of this suction opening. The front panel which the above-mentioned suction opening is attached by the front part of the method of wrap above-mentioned air conditioner body, and bay curving of the front part is carried out by side view, and makes a smooth curved surface.

a front side heat exchanger part which counters with the above-mentioned suction opening in this air conditioner body, is arranged, and carries out bay curving by side view -- and, A heat exchanger which is provided with a rear side heat exchanger part of the shape of direct [ which inclines in slanting back from an upper bed of this front side heat exchanger part ], and is formed in the shape of an abbreviated reverse V character, A fan arranged between a before [ the above ] side heat exchanger part of this heat exchanger, and the above-mentioned rear side heat exchanger part, It is arranged between the above-mentioned suction opening and a front side heat exchanger part, provide an electrostatic precipitator which has a dust collecting function and an ozone generation function, and the above-mentioned front panel, A movable panel which projects at the time of the usual air-conditioning operation and drying operation in a main part, drives, and opens the above-mentioned suction opening wide, and a retreat drive is carried out at the time of sterilizing operation in a main part which makes ozone evolution operation of the time of shutdown, and the above-mentioned electrostatic precipitator, and closes a suction opening.

[Claim 2]The air conditioner according to claim 1 setting up so that a crevice between suction openings of a movable panel upper bed veranda may become larger than a crevice between suction openings by the side of a movable panel lower end edge after the above-mentioned movable panel has opened a suction opening wide.

[Claim 3]An air conditioner given in either claim 1, wherein the above-mentioned movable panel is set up so that a movable locus at the time of suction opening opening and closing may draw a convex circle, and claim 2.

[Claim 4]The air conditioner according to any one of claims 1 to 3 considering the above-mentioned movable panel as composition which can be freely detached and attached by one-touch to the above-mentioned front panel.

[Claim 5]The air conditioner according to claim 1 having provided an up-and-down louver of two or more sheets allocated in a cross direction enabling free opening and closing in the above-mentioned exit cone, having made it open the front end part upper part of a louver by the side of front wide at the time of drying operation in a main part, and sterilizing operation in a main part, and making a front end part of a back louver carry out the lap of the rear end part to it.

[Claim 6]The air conditioner according to claim 5 provided with a control means controlled to project, to drive the above-mentioned movable panel and to open a suction opening before rotating a louver of the above-mentioned exit cone and opening an exit cone at the time of the

usual air-conditioning start up.

[Claim 7]At the time of the usual air-conditioning start up characterized by comprising the following.

After a movable panel carries out specified quantity opening of the suction opening.  
A control means controlled to raise a speed change of the above-mentioned fan after carrying out specified time elapse.

[Claim 8]When a movable panel changes a suction opening into closing from opening according to a change of the above-mentioned mode of operation and instructions by which interruption enters and a movable panel changes a suction opening into opening from closing come, The air conditioner according to any one of claims 1 to 7 provided with a control means controlled to give priority to suction opening opening motion of a movable panel.

[Claim 9]The air conditioner comprising according to any one of claims 1 to 7:

A detector style which the above-mentioned front panel is attached to an air conditioner body, enabling free opening and closing, and detects opening and closing of this front panel.  
A control means controlled to return a movable panel to a suction opening open position when start-up instructions come after detecting closing of the front panel by this detector style.

---

[Translation done.]

**\* NOTICES \***

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**DETAILED DESCRIPTION**

---

**[Detailed Description of the Invention]****[0001]**

[Field of the Invention]This invention relates to the air conditioner which comprises an interior unit and an exterior unit, and relates to the body front part structure especially provided with the suction opening in an interior unit.

**[0002]**

[Description of the Prior Art]In the interior unit of the air conditioner which comprises an interior unit and an exterior unit, a main part is equipped with a suction opening and an exit cone, and a heat exchanger, a fan, etc. are accommodated in the inside of a main part.

[0003]It is in the tendency for the heat exchanger formed in the shape of an abbreviated reverse V character combining the front side heat exchanger part by which bay curving is carried out, and the rear side heat exchanger part which inclines aslant by the shape of direct by side view to be adopted, recently.

[0004]The up-and-down wind shift louver is provided in the above-mentioned exit cone, and it can switch to it so that it can blow off in the optimal direction according to a change with cooling operation and heating operation.

[0005]On the other hand, although the suction opening is equipped with the grill and air filter which cover the inside of a main part, if long-term use is covered, the dust which invaded from the crevice in a main part, etc. will carry out adhesion accumulation to a heat exchanger, will adhere to a fan fan, or will adhere to a forced draft air duct or a drain pan.

[0006]When cooling operation is suspended at the time of cooling operation, In order that a part may be having adhered to the heat exchanger with as or may remain in a drain pan, without the water of condensation condensed by the heat exchanger being thoroughly drained by outdoor, The humidity in a main part becomes high and propagation of saprophytic bacteria and mold which are contained in the dust adhering to the fan fan which is component parts, a heat exchanger, etc. has brought a result which becomes strong more.

**[0007]**

[Problem(s) to be Solved by the Invention]Then, recently, while performing dehumidifying operation after the end of cooling operation, the short circuit of the dry air which blows off from an exit cone is directly carried out to a suction opening, and internal configuration equipment is dried. Drying operation in a main part which is drawn as mentioned above and is again circulated from an exit cone is performed after it, and propagation of saprophytic bacteria and mold is made to prevent.

[0008]In the interior unit provided with the electrostatic precipitator which catches and collects dust for the dust which was not able to be caught with an air filter, Sterilizing and sterilizing certainly saprophytic bacteria and mold adhering to internal configuration equipment, and reducing propagation of saprophytic bacteria and mold is examined by using the ozone generated with the discharge electrode of an electrostatic precipitator, and making the whole inside of a main part filled with ozone.

[0009]For this reason, although the composition and the control means of the interior unit for performing effectively sterilizing operation using the drying operation in a main part and ozone by

this short circuit were examined and it was, it was not able to be said that it was still enough. [0010]The place which this invention is made in view of the above-mentioned situation, and is made into the purpose, Make the optimal shape structure of the body front part to the heat exchanger formed in the shape of an abbreviated reverse V character by side view, aim at air-capacity reservation of heat exchanging air, and Reduction of the stagnation region of the sink air current to a heat exchanger, The leakage of the operation noise from the front part can be reduced, and it is going to provide the air conditioner which obtains improvement in the short circuit characteristic at the time of closing not to mention the time of opening of a movable panel.

[0011]

[Means for Solving the Problem]In order to satisfy the above-mentioned purpose, this inventions are a suction opening provided in the front part of an air conditioner body and this air conditioner body, and the lower part of this suction opening as the 1st means, An exit cone provided in a back position rather than a suction opening, and the front panel which the above-mentioned suction opening is attached by the front part of the method of wrap above-mentioned air conditioner body, and bay curving of the front part is carried out by side view, and makes a smooth curved surface, A heat exchanger which counters with the above-mentioned suction opening in this air conditioner body, is arranged, is provided with a front side heat exchanger part which carries out bay curving by side view, and a rear side heat exchanger part of the shape of direct [ which inclines in slanting back from an upper bed of this front side heat exchanger part ], and is formed in the shape of an abbreviation reverse V character, A fan arranged between a front side heat exchanger part of this heat exchanger, and a rear side heat exchanger part, It is arranged between the above-mentioned suction opening and a front side heat exchanger part, provide an electrostatic precipitator which has a dust collecting function and an ozone generation function, and the above-mentioned front panel, It projected at the time of the usual air-conditioning operation and drying operation in a main part, and it drove, the above-mentioned suction opening was opened wide, and a movable panel which a retreat drive is carried out at the time of sterilizing operation in a main part which makes ozone evolution operation of the time of shutdown and the above-mentioned electrostatic precipitator, and closes a suction opening was provided.

[0012]As the 2nd means, after the above-mentioned movable panel has opened a suction opening wide, a crevice between suction openings of a movable panel upper bed marginal veranda is set up become larger than a crevice between suction openings of a movable panel lower end edge veranda.

[0013]As the 3rd means, the above-mentioned movable panel is set up so that a movable locus at the time of suction opening opening and closing may draw a convex circle.

[0014]As the 4th means, the above-mentioned movable panel was considered as composition which can be freely detached and attached by one-touch to the above-mentioned front panel.

[0015]An up-and-down louver of two or more sheets allocated in a cross direction enabling free opening and closing is provided, the above-mentioned exit cone was made to open the front end part upper part of a louver by the side of front wide, and a front end part of a back louver was made to carry out the lap of the rear end part to it as the 5th means at the time of drying operation in a main part, and sterilizing operation in a main part.

[0016]Before rotating a louver of the above-mentioned exit cone and opening an exit cone as the 6th means at the time of the usual air-conditioning start up, it had a control means controlled to project, to drive the above-mentioned movable panel and to open a suction opening.

[0017]After a movable panel carried out specified quantity opening of the suction opening as the 7th means at the time of the usual air-conditioning start up, or after carrying out specified time elapse, it had a control means controlled to raise a speed change of the above-mentioned fan.

[0018]When a movable panel changed a suction opening into closing from opening as the 8th means according to a change of the above-mentioned mode of operation, interruption entered, and a movable panel was provided with a control means controlled to give priority to suction opening opening motion of a movable panel when instructions which change a suction opening

into opening from closing came.

[0019]As the 9th means, the above-mentioned front panel is attached to an air conditioner body, enabling free opening and closing, It had a detector style which detects opening and closing of this front panel, and when start-up instructions came after detecting closing of the front panel by this detector style, it had a control means controlled to return a movable panel to a suction opening open position.

[0020]Make optimal shape structure of a body front part to a heat exchanger formed in the shape of an abbreviated reverse V character by side view by adopting a means to solve such a technical problem, aim at air-capacity reservation of heat exchanging air, and Reduction of a stagnation region of a sink air current to a heat exchanger, Leakage of an operation noise from the front part can be reduced, and improvement in the short circuit characteristic can be obtained not to mention the time of opening of a movable panel at the time of closing.

[0021]

[Embodiment of the Invention]Hereafter, the 1 embodiment of this invention is described based on a drawing. Drawing 1 shows typically the section of the interior unit which constitutes an air conditioner. One in a figure is a main part of a unit (air conditioner body), and this is provided with the front part by which bay curving is carried out by side view. The upper face part, the undersurface part, and the both sides part are making plate-like mostly.

[0022]The high suction 2 is formed in the upper face part of this main part 1 of a unit, and the anterior part suction opening 3 is formed in the front part. The front panel 4 is attached to the front part of the main part 1 of a unit so that the above-mentioned anterior part suction opening 3 may be covered.

[0023]Cavity formation of the center section is carried out, and the above-mentioned front panel 4 is carrying out the opening of this cavity portion except for the periphery. The movable panel 6 supported by the opening-and-closing drive mechanism 5 mentioned later is attached to the cavity portion of the front panel 4, and it makes into it that opening and closing of the anterior part suction opening 3 which is an opening are free.

[0024]Bay curving is carried out so that both the panels 6 and 4 may project in one where the above-mentioned movable panel 6 is inserted in the cavity portion of the front panel 4, and they may project in a near side with predetermined curvature. It is the same curved surface that does not have a level difference in the mating face between [ 6 and 4 ] panels, and each is formed in the very smooth field. The panel which constitutes other surface parts excluding the above-mentioned front panel 4 and the above-mentioned movable panel 6 of the main part 1 of a unit is similarly formed in the very smooth field.

[0025]Along with the lower part of the anterior part suction opening 3, the exit cone 7 is formed in the main part 1 of a unit rather than this suction opening at the back position. This exit cone 7 can be freely opened and closed by the blow-off louvers 8A and 8B of two sheets by which rotation control is carried out separately, respectively.

[0026]In the main part 1 of a unit, the heat exchanger 9 formed in the shape of an abbreviated reverse V character in the front side heat exchanger part 9A and the rear side heat exchanger part 9B is arranged. The before [ the above ] side heat exchanger part 9A consists the front panel 4 and the movable panel 6, and a gap, and bay curving is carried out almost in parallel. The rear side heat exchanger part 9B inclines aslant by the shape of direct, and counters with the high suction 2.

[0027]The electrostatic precipitator 10 is attached to the front-face side of the front side heat exchanger part 9A of the above-mentioned heat exchanger 9. This electrostatic precipitator 10 between a discharge electrode and a dust collecting electrode from the 1st high voltage power that has a discharge electrode and the dust collecting electrode made into ground potential inside, and generates the 1st negative, comparatively high high tension and the 2nd negative high tension lower than this, Two negative high tensions are switched, respectively and can be impressed now.

[0028]In carrying out original dust collection operation for the electrostatic precipitator 10, it impresses the 2nd high tension between a discharge electrode and a dust collecting electrode. It is possible to also make it operate as an ozone generating device, and in this case, if a discharge

electrode is made to impress and discharge the 1st high tension, ozone will occur.

[0029]That is, the potential difference between a discharge electrode and a dust collecting electrode has a direction larger than the time of dust collection operation at the time of ozone evolution. It is good also as the same in the voltage impressed to a discharge electrode in the time of making it function as an electrostatic precipitator, and making it function as an ozone generating device.

[0030]It is between the above-mentioned heat exchanger 9 order side heat exchanger parts 9A and 9B, and it counters with the above-mentioned exit cone 7, and the fan 11 is arranged. This fan 11 is provided with the width direction dimension of the heat exchanger 9, and the axial dimension same in abbreviation, and comprises a cross flow fan which counters with the heat exchanger 9 and is arranged, and a fan motor which rotates this cross flow fan.

[0031]The lower end part of the before [ the above ] side heat exchanger part 9A appears on the front drain pan 12A, and it appears on the rear drain pan 12B, and the lower end part of the rear side heat exchanger part 9B receives the drain water dropped from each heat exchanger part 9A and 9B, and can drain it now outside via the exhaust hose which is not illustrated.

[0032]The partial side-attachment-wall outside surface of the order drain pans 12A and 12B is established in the position close to the fan 11, and constitutes the nose to the fan of the fan 11 from these.

[0033]It is connected by the septum member 13 between the side wall part of the drain pans 12A and 12B before and after constituting nose, and each side part of the exit cone 7. The space surrounded by this septum member 13 serves as the blow-off ventilation flue 14 which opens nose and the exit cone 7 for free passage.

[0034]On the other hand, the anterior part suction opening 3 and the high suction 2 are countered, and the filter 15 is attached between these suction openings 3 and 2, the anterior part heat exchanger part 9A, and the top heat exchanger part 9B. This filter 15 is inserted from the lower end of the front panel 6 which exit-cone 7 upper bed opened, and can be freely removed from the part if needed.

[0035]Next, the opening-and-closing drive mechanism 5 which carries out the attitude drive of the above-mentioned front panel 4, the movable panel 6, and the movable panel 6 is explained in full detail.

[0036]The above-mentioned opening-and-closing drive mechanism 5 comprises two or more sets of link members 20, the driving shaft 21 which connects these link members 20, and a driving source which drive this driving shaft 21 and which is not illustrated here.

[0037]Two or more sets of link members 20 are altogether attached to the flat part 1A formed in the cavity portion of the front panel 4. \*\*\*\* with movable panel 6 rear face in the state where the driving shaft 21 closes the flat part 1A and the anterior part suction opening 3 with the link member 20 -- it is accommodated in few spaces.

[0038]the driving source of the blow-off louvers 8A and 8B which the above-mentioned driving source has in the one side part of the driving shaft 21, and open and close the exit cone 7 -- it is provided very much at least in one copy of main part of a near position, electric wiring is communalized, and simplification of wiring work is attained.

[0039]Drawing 2 and drawing 3 show some opening-and-closing drive mechanisms 5 attached to the front panel 4 in the state where the movable panel 6 was demounted, and the main part 1 of a unit and the front panel 4 as a perspective view. And drawing 2 is shown and the opening-and-closing drive mechanism 5 when the movable panel 6 which is not illustrated closes the state 3 which closed the opening of the front panel 4, i.e., an anterior part suction opening, drawing 3, The opening-and-closing drive mechanism 5 when the movable panel 6 which is not illustrated opens wide the state 3 which opened the opening of the front panel 4 wide, i.e., an anterior part suction opening, is shown.

[0040]In the above-mentioned front panel 4, the link member 20 which constitutes the opening-and-closing drive mechanism 5 in the central flat part 1A is mostly attached with the flat part 1A of both sides. Two or more sets of link members 20 are connected with the one above-mentioned driving shaft 21 established horizontally.

[0041]Although the left end portions of the driving shaft 21 are projected from the link member

20 to the method of outside and it is not shown at least in this end and one copy of main part of a unit which counters for details, the driving source 22 which consists of a drive motor which is a driving source, and a mechanism in which the driving force of this drive motor is transmitted to the above-mentioned driving shaft is attached.

[0042]Since it is such composition, if it energizes to the above-mentioned driving source 22 and driving force is transmitted to the driving shaft 21, it is set up so that two or more sets of link members 20 may make the operation same all at once.

[0043]And each link member 20 is provided with the following.

The top by-pass link 23A where an end part is attached in the above-mentioned driving shaft 21. The lower by-pass link 23B where an end part is mechanically connected with the top by-pass link 23A.

For example, a gear part is provided in each and it is made to gear mutually as mechanical connecting mechanism.

[0044]The torsion spring which an overall length is formed for a long time rather than the lower by-pass link 23B, and the top by-pass link 23A omits for details in the base end of each link is looped around. In a top, by this torsion spring, press energizing of the tip part of the lower by-pass links 23A and 23B is elastically carried out in the direction which contacts the flat part 1A.

[0045]At drawing 2, on the whole, the vertical section by-pass links 23A and 23B contact the flat part 1A according to the elastic force of torsion spring, and drawing 3 shows the state where the elastic force of torsion spring was resisted and the vertical section by-pass links 23A and 23B have projected.

[0046]Drawing 4 is a perspective view by the side of movable panel 6 rear face for explaining the above-mentioned opening-and-closing drive mechanism 5.

[0047]The base end of the vertical section by-pass links 23A and 23B is put by the link cover 20a from both sides. The base end of each links 23A and 23B put by the above-mentioned link cover 20a is connected mechanically as mentioned above.

[0048]Therefore, the top by-pass link 23A which the driving shaft 21 penetrates is a driving-side link, and the lower by-pass link 23B turns into a follower by-pass link. The mutual rotation angle of the vertical section by-pass links 23A and 23B is set up make identitas mostly to the flat part 1A.

[0049]the tip part of the mutual links 23A and 23B -- a thickness direction -- two forks -- it is formed in \*\* and a pin part protrudes on these insides at one. these two forks -- it is engaging with the pore by which the engaging members 28A and 28B provided in the rear-face side of the movable panel 6 are inserted, and the above-mentioned pin part is provided between the ends of \*\* at the engaging members 28A and 28B.

[0050]The pore provided in the upper part side engaging member 28A is a round hole, and the pin part of the top by-pass link 23A is supported, enabling free rotation. It is supported that the pore provided in the lower part side engaging member 28B can consist of long holes on the other hand, and the pin part of the lower by-pass link 23B can be freely rotated to a long hole, enabling free movement.

[0051]any tip part of the links 23A and 23B -- two forks -- since it is formed in \*\* -- two forks -- if a part is opened to the method of outside, the pin part provided in this inside will escape from and come out of the pore provided in the engaging members 28A and 28B.

[0052]That is, it is possible to remove the movable panel 6 from the front panel 4 comparatively easily, and it can also perform comparatively easily attaching the once demounted movable panel 6 to the front panel 4 again.

[0053]Thus, it is an interior unit of the air conditioner constituted, and as again shown in drawing 1, the anterior part suction opening 3 is closed at the time of a stop, and there is no invasion of dust of six movable panel in main part of unit 1 inside from this suction opening. The exit cone 7 is also closed by the blow-off louvers 8A and 8B of two sheets.

[0054]If the driving switch of the remote control is switched to one, the opening-and-closing drive mechanism 5 will operate, the above-mentioned movable panel 6 will carry out projection movement to a near side so that it may mention later, and the anterior part suction opening 3 will be opened wide.

[0055]That is, in the opening-and-closing drive mechanism 5 when the movable panel 6 is closing the anterior part suction opening 3, the top by-pass link 23A and the lower by-pass link 23B which constitute the link member 20 become vertical [-like ], and it is visible just like the direct-like link of one.

[0056]At this time, the pin part of the lower by-pass link 23B is engaging with the bottom of the pore which consists of a long hole of the lower part side engaging member 28B. Have drawn near to the main part 1 side most each engaging members 28A and 28B, the movable panel 6 provided with these engaging members 28A and 28B closes the anterior part suction opening 3 thoroughly.

[0057]The driving source 22 of the opening-and-closing drive mechanism 5 carries out the rotation drive of the driving shaft 21 in the counter clockwise direction in drawing 1 and drawing 2 at the same time air conditioning operation is started. Since the top by-pass link 23A and the lower by-pass link 23B are connected mechanically, the elastic force of torsion spring is resisted, and it rotates so that the tip part may project ahead.

[0058]The driving source 22 stops in the place which carried out specified quantity rotation of the driving shaft 21. Each upper-and-lower-ends part rotates in the direction which approaches mutually, and the vertical section by-pass links 23A and 23B become the shape of abbreviation Ha's character, as shown in drawing 3.

[0059]The movable panel 6 carries out projection movement to a near side via each links 23A and 23B and the engaging members 28A and 28B, and the anterior part suction opening 3 is opened wide. In this state, the pin part of the lower by-pass link 23B engages with the upper bed of the long hole of the lower part side engaging member 28B.

[0060]Drawing of longitudinal section in the state where, as for drawing 5, the movable panel 6 opened the anterior part suction opening 3 wide, and drawing 6 are the side views of the interior unit of the same state. Although it is omitting in drawing 6, the blow-off louvers 8A and 8B with which the exit cone 7 is equipped carry out specified quantity rotation according to change setting out of cooling operation and heating operation. While the fan 11 makes an air blasting operation, the compressor of an exterior unit drives and refrigerating cycle operation is started.

[0061]Indoor air is drawn in the main part 1 of a unit from the high suction 2 and the anterior part suction opening 3, and passes the air filter 15. The dust contained in indoor air is caught by the air filter 15, where dust is removed, the heat exchanger 9 is passed, and heat exchange actions are performed.

[0062]This heat exchanging air is drawn along the blow-off ventilation flue 14, and it blows off from the exit cone 7, it shows around at the louvers 8A and 8B, and blows off to the interior of a room, and efficient air-conditioning operation is made.

[0063]The above-mentioned electrostatic precipitator 10 acts and the dust which was not caught with the air filter 15 is caught thoroughly. Therefore, the defecated air blows off from the exit cone 7 indoors via the heat exchanger 9.

[0064]Thus, the optimal shape structure of the front panel 4 attached to the front part of the main part 1 of a unit to the heat exchanger 9 formed in the shape of an abbreviated reverse V character by side view and the movable panel 6 which constitutes a part of this front panel 4 can be acquired especially.

[0065]Therefore, the leakage of the sound to the front of reduction of the whizzing sound of the heat exchanger 9 and the blowing sound of fan 11 fan decreases, and comfortable air conditioning is obtained. Reservation of air capacity is obtained, the stagnation region of the sink air current to the heat exchanger 9 is reduced, and improvement in heat exchanging efficiency and air conditioning performance is obtained.

[0066]Like the statement to drawing 5, after the movable panel 6 has carried out full opening of the anterior part suction opening 3, the crevice Sa between the anterior part suction openings 3 of a movable panel 6 upper-bed veranda is set as size (Sa>Sb) rather than the crevice Sb by the side of movable panel 6 lower end edge.

[0067]Usually, an interior unit is a wall surface of a sitting-room, and is attached to the height near a ceiling, and a resident looks up at the bottom to interior units [ most ]. Under such conditions, since the movable panel 6 consists the front panel 4 and a crevice in the state of

(Sa>Sb), from a resident, the movable panel 6 seems to hardly move, and it is comfortable, and is good-looking.

[0068]Not only it but the air current from the upper gap Sa is secured, it becomes easy to pass along an air current to the electrostatic precipitator 10 arranged so that an upper gap may be countered, and improvement in the dust collection efficiency of an electrostatic precipitator can be aimed at.

[0069]If the driving switch of the remote control is turned OFF in order to terminate air conditioning operation, operation of a compressor, the fan 11, and the electrostatic precipitator 10 will stop, and the opening-and-closing drive mechanism 5 will carry out backing movement of the movable panel 6, and the anterior part suction opening 3 will be closed.

[0070]After the above-mentioned opening-and-closing drive mechanism 5 rotates the driving shaft 21 to an opposite direction and the pin part of the lower by-pass link 23B moves the pore (long hole) of the engaging member 28B, this engaging member 28B is pulled up.

[0071]And from a difference of the overall length of the vertical section by-pass links 23A and 23B, the movement magnitude to the up-and-down engaging members 28A and 28B and front panel 6 vertical section is proportional to the opening quantity of the anterior part suction opening 3, and closes the anterior part suction opening 3 finally.

[0072]Therefore, the anterior part suction opening 3 can be opened and closed with the movable panel 6, full closing of the anterior part suction opening 3 is carried out in this interior unit at the time of shutdown, the inside invasion of main part 1 of dust is prevented, and there is no various fault generating.

[0073]A dashed dotted line comes to show the locus from anterior part suction opening 3 closed state of the movable panel 6 to an opened condition, and the locus from an opened condition to a closed state to drawing 6 from the composition of the above-mentioned opening-and-closing drive mechanism 5.

[0074]Although the movable locus of the upper bed of the movable panel 6 is shown here, shape is made overall almost similarly, and it is formed so that a convex circle may be drawn. That is, since it is a convex curve, the peak p exists.

[0075]Under a certain situation, if the upper bed part of the movable panel 6 is in the front panel 4 side from the peak p when the opening-and-closing drive mechanism 5 stops in the middle of opening and closing, it will move in the direction which closes the anterior part suction opening 3 naturally by prudence of the movable panel 6, and will be in a closed state finally.

[0076]As the movable panel 6 is moving to the closed state from opening of the suction opening 3, prudence of the movable panel 6 is added, and the operation of the opening-and-closing drive mechanism 5 will become smooth, and will be from the position beyond the peak p in a closed state immediately.

[0077]On the contrary, if the upper bed part of the movable panel 6 is in a near side from the peak p when the opening-and-closing drive mechanism 5 stops in the middle of opening and closing, it will move in the direction which opens the anterior part suction opening 3 naturally by prudence of the movable panel 6, and will be in an opened condition finally.

[0078]As the movable panel 6 is moving to the opened condition from closing of the suction opening 3, prudence of the movable panel 6 is added, and the operation of the opening-and-closing drive mechanism 5 will become smooth, and will be from the position beyond the peak p in an opened condition immediately.

[0079]Anyway, if the movable locus at the time of opening and closing of the movable panel 6 is formed so that a convex circle may be drawn, and the peak p is made to exist, the switching action of the movable panel 6 is smooth, and becomes certain, and reservation of reliability can be obtained.

[0080]In this interior unit, the following two kinds of short circuit air streams can be formed easily.

[0081]As shown in the 1st drawing 7, it is the drying operation in a main part. That is, the opening-and-closing drive mechanism 5 is operated after the end of cooling operation, and the movable panel 6 is made into an opened condition. A horizontal direction, the upward directions beyond it, nothing, and the blow-off louver 8B on the backside close the blow-off louver 8A by

the side of front.

[0082]However, the front side blow-off louver 8A rotates only a front end part, and a rear end part is constituted so that it may be in the state where the backside louver 8B front end part was made to carry out a lap. By this, blow off of the air which blows off from the exit cone 7 which came only between the front side blow-off louver 8A front end part and the exit-cone front end part, and was concentrated becomes possible.

[0083]The two-way valve provided between the front side heat exchanger part 9A and the rear side heat exchanger part 9B which constitute the heat exchanger 9 is extracted, it changes into a dehumidification state, refrigerating cycle operation is started, and the fan 11 is driven. In this case, the electrostatic precipitator 10 makes dust collection operation.

[0084]The front side heat exchanger 9A turns into a condenser (reheater), the rear side heat exchanger part 9B acts as an evaporator, and the dry air blows off, and it is led to the passage 14 and blows off from the exit cone 7 further.

[0085]From wind-direction setting out of the blow-off louver 8A by the side of front, the dry air which blows off from the exit cone 7 flows along the lower part of the front panel 4 to the upper part. Since the movable panel 6 has projected from the front panel 4, dry air is drawn between the movable panel 6 and the front panel 4, and is inhaled in the main part 1 of a unit from the anterior part suction opening 3.

[0086]Dry air is removed by the filter 15 in dust, and the dust which remained with the electrostatic precipitator 10 further is removed. And it is led to the heat exchanger 9 as mentioned above, and dries, and a short circuit is carried out from the exit cone 7 to the anterior part suction opening 3.

[0087]If cooling operation is performed especially, the water of condensation condensed by the heat exchanger 9 will evaporate, and the inside of the main part 1 will carry out high humidity. Then, while performing dehumidifying operation, the short circuit of the dry air is directly carried out to the anterior part suction opening 3 from the exit cone 7, and the inside of a main part is circulated.

[0088]The moisture of main part 1 inside evaporates quickly, and the inside of the main part 1 dries. By this, internal configuration equipment dries immediately and controls propagation of saprophytic bacteria and mold. The moisture which evaporated is made to condense in the rear side heat exchanger part (evaporator) 9B by a short circuit, and is collected as drain water.

[0089]Bay curving of the front panel 4 and the movable panel 6 is carried out by side view, and make the flat curved surface which does not have unevenness mutually, and also. Since the anterior part suction opening 3 is ahead located rather than the exit cone 7, a short circuit air stream flows very smoothly, it is good and the dehumidification of the short circuit characteristic which does not take out a wind to a habitation region is attained.

[0090]As shown in the 2nd drawing 8, when it carries out for every predetermined period, it is the good sterilizing operation in a main part. At this time, the movable panel 6 holds a closed state and sets the front side blow-off louver 8A as an above-mentioned position. Therefore, intensive blow off becomes possible. Refrigerating cycle operation is not performed but the fan 11 is driven.

[0091]And the electrostatic precipitator 10 is made into an ON state, and makes ozone evolution operation. That is, the discharge electrode in the electrostatic precipitator 10 is made to impress and discharge the 1st high tension, and generating of ozone is obtained.

[0092]The air which blows off from the exit cone 7 flows smoothly along the curved surface of the front panel 4 and the movable panel 6, and results in the upper surface of the main part 1. In the high suction 2 of the main part 1 upper surface, the negative pressure by suction of the fan 11 has occurred, and the air drawn here is inhaled in the main part 1.

[0093]Although it is only passing the heat exchanger 9, the ozone generated with the ozone evolution operation by the electrostatic precipitator 10 is contained in distribution air. It is filled with distribution air in the main part 1, and after it circulates to all the corners, it blows off from the exit cone 7 again, and a short circuit is carried out to the high suction 2.

[0094]Though saprophytic bacteria and mold had adhered to the fan and the heat exchanger 9 of the fan 11 accommodated in a main part, by carrying out circulation circulation of the air having

contained ozone, saprophytic bacteria and mold are sterilized or sterilized and these propagation is prevented.

[0095]As mentioned above, bay curving of the front panel 4 and the movable panel 6 is carried out by side view, and each panel is formed in a smooth curved surface without unevenness. The anterior part suction opening 3 is ahead located rather than the exit cone 7, and negative pressure is acting on the high suction 2.

[0096]From these composition, the air which blows off from the exit cone 7 flows smoothly according to what is called a Coanda effect along the upper part from the lower part of the front panel 4 and the movable panel 6, and does not have the loss of air capacity on the way, and its short circuit characteristic is good.

[0097]Although the above-mentioned movable panel 6 is attached to the front panel 4 via the opening-and-closing drive mechanism 5, actual connection is only engagement to the link member 23A by the side of the front panel 4, 23B pin part, and the engaging member 28A by the side of the movable panel 6 and 28B pore.

[0098]Therefore, the movable panel 6 can be freely detached and attached by one-touch from the front panel 4, and can perform wiping work of dirt, etc. easily. And with the front panel 4, since the movable panel 6 makes a flat curved surface without unevenness, dirt is not attached easily, and also it tends to carry out wiping of dirt, and can always hold the beautiful appearance of the beginning.

[0099]As shown only in drawing 1, the control section (control means) 30 which it has in the main part 1 of a unit makes control which is described below.

[0100]Before rotating the blow-off louvers 8A and 8B and opening the exit cone 7 at the time of the usual air-conditioning starts up, such as air conditioning, heating, and dehumidification, it controls to operate the opening-and-closing drive mechanism 5, to make the movable panel 6 project, and to make the anterior part suction opening 3 open wide.

[0101]After it, although the fan 11 is driven and an air blasting operation is made to perform, since the movable panel 6 is made to project, there is no fault of the opening motion of the movable panel 6 by the negative pressure accompanying fan 11 drive, and high reliability can already be acquired.

[0102]After the movable panel 6 carried out specified quantity opening of the suction opening 3 at the time of the usual air-conditioning start up, or after carrying out specified time elapse, it controls to raise the speed change of the fan 11. That is, there is no fault of the opening motion of the movable panel 6 by the negative pressure accompanying fan 11 drive, and high reliability can be acquired.

[0103]When the movable panel 6 changes the suction opening 3 into closing from opening according to the change of the mode of operation, interruption enters, and when the instructions by which the movable panel 6 changes the suction opening 3 into opening from closing come, it controls to give priority to suction opening 3 opening motion of the movable panel 6.

[0104]Thus, even if there is sudden interruption, by giving priority to the opening motion of the movable panel 6, there is no fault of the opening motion of the movable panel 6 by the negative pressure accompanying fan 11 drive, and high reliability can be acquired.

[0105]On the other hand, in order to remove the dust adhering to the filter 15, it is necessary to remove a filter. Or the forced operation switch attached to the main part 1 without using a remote control may be carried out to one, and forced operation may be started.

[0106]Then, as shown in drawing 9, the front panel 4 was attached to the main part 1, enabling free opening and closing, and the forced operation switch 17 is further attached with the detector style 16 which detects opening and closing of the front panel 4 to the front part of the main part 1.

[0107]Operation is not started even if it carries out the driving switch of the remote control, or the forced operation switch 17 of main part 1 attachment to one, while the detector style 16 is detecting opening of the front panel 4.

[0108]A user closes the front panel 4 and operation is started because the detector style 16 detects it. Even if it closes the front panel 4 with the state where the user closed the movable panel 6 as shown in a figure, at this time, a control section is controlled to return the movable

panel 6 to the open position of the suction opening 3.

[0109]After it, since the above-mentioned fan 11 is driven and an air blasting operation is made, there is no fault of the opening motion of the movable panel 6 by the negative pressure accompanying fan 11 drive, and high reliability can be acquired.

[0110]

[Effect of the Invention]According to this invention, as explained above, make the optimal shape structure of the body front part to the heat exchanger formed in the shape of an abbreviated reverse V character by side view, aim at air-capacity reservation of heat exchanging air, and Reduction of the stagnation region of the sink air current to a heat exchanger, The leakage of the operation noise from the front part can be reduced, and effects, such as obtaining improvement in the short circuit characteristic at the time of closing, are done so not to mention the time of opening of a movable panel.

---

[Translation done.]

**\* NOTICES \***

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

**DESCRIPTION OF DRAWINGS**

---

**[Brief Description of the Drawings]**

[Drawing 1]The outline sectional view of the interior unit which constitutes an air conditioner showing the 1 embodiment of this invention.

[Drawing 2]The outline perspective view of the body front part which demounted the movable panel showing the embodiment.

[Drawing 3]The outline perspective view of the body front part in which opening-and-closing drive mechanism differs from drawing 2 showing the embodiment.

[Drawing 4]The perspective view by the side of the rear face of a movable panel showing the embodiment.

[Drawing 5]The outline sectional view of the interior unit at the time of opening of a movable panel which shows the embodiment.

[Drawing 6]The outline sectional view of the interior unit at the time of opening of a movable panel which shows the embodiment.

[Drawing 7]The figure which illustrates a short circuit air stream after opening wide the movable panel in which the embodiment is shown.

[Drawing 8]The figure which illustrates a short circuit air stream after closing the movable panel in which the embodiment is shown.

[Drawing 9]The perspective view in the state where the front panel was opened wide showing the embodiment.

**[Description of Notations]**

1 --- Main part of a unit (air conditioner body),

3 --- Anterior part suction opening,

7 --- Exit cone

4 --- Front panel

9A --- Before side heat exchanger part,

9B --- Rear side heat exchanger part,

9 --- Heat exchanger,

11 --- Fan,

10 --- Electrostatic precipitator,

6 --- Movable panel

8A, 8B --- Blow-off louver,

16 --- Detector style,

30 --- Control section (control means).

---

[Translation done.]

[19] 中华人民共和国国家知识产权局

[51] Int. Cl<sup>7</sup>

F24F 3/06

F24F 13/00



## [12] 发明专利申请公开说明书

[21] 申请号 02131992.8

[43] 公开日 2003 年 3 月 19 日

[11] 公开号 CN 1403748A

[22] 申请日 2002.8.28 [21] 申请号 02131992.8

[30] 优先权

[32] 2001.8.28 [33] JP [31] 2001-258463

[71] 申请人 东芝开利株式会社

地址 日本东京

[72] 发明人 竹谷伸行 小泽哲朗 和田宏二

[74] 专利代理机构 上海专利商标事务所

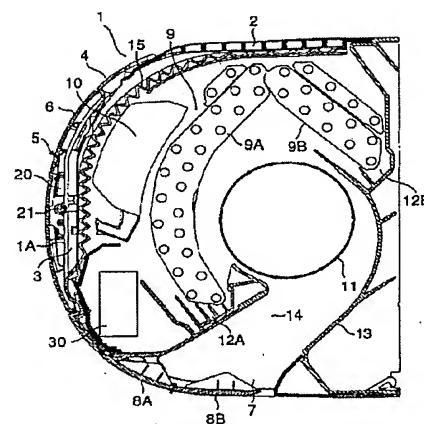
代理人 王宏祥

权利要求书 2 页 说明书 11 页 附图 9 页

[54] 发明名称 空调机

[57] 摘要

一种空调机，在空调机本体(1)的前面部设有吸入口(3)，在其下部后方设有吹出口(7)，从侧面看安装覆盖吸入口并弯曲形成的、作成完全无凹凸的平滑的前面板(4)，从侧面看配置由与吸入口相对而弯曲形成的前侧热交换器部(9A)和直状的后侧热交换器部(9B)所构成的大致倒 V 字状的热交换器(9)，在前后侧热交换器部之间配置送风机(11)，在吸入口与热交换器之间配置可对集尘动作与臭氧发生动作进行切换的吸尘机，在前面板上具有在通常的空调运转时和本体内干燥运转时突出而开放吸入口、在停止运转时和本体内杀菌运转时关闭吸入口的可动面板(6)。故能确保热交换空气的风量、减少吸入气流在热交换器处的滞留区域、减少从前面部泄漏的运转噪音，提高短路特性。



I S S N 1 0 0 8 - 4 2 7 4

1. 一种空调机，其特征在于，具有：

空调机本体；

设在该空调机本体前面部上的吸入口和设在该吸入口的下部、设在吸入口的后方位置上的吹出口；

覆盖所述吸入口地安装在所述空调机本体的前面部上、从侧面看前面部弯曲形成的、且构成平滑的曲面的前面板；

形成大致倒 V 字状的热交换器，其具有在该空调机本体内与所述吸入口相对配置的、从侧面看形成弯曲的前侧热交换器部和从该前侧热交换器部的上侧向斜后方倾斜的直状的后侧热交换器部；

配置在该热交换器的所述前侧热交换器部与所述后侧热交换器部之间的送风机；

配置在所述吸入口与前侧热交换器部之间的、具有集尘功能和臭氧发生功能的吸尘机，

所述前面板，具有在通常的空调运转时和在本体内干燥运转时被突出驱动而开放所述吸入口、在运转停止时和在所述吸尘机进行臭氧发生动作的、本体内杀菌运转时被后退驱动而关闭吸入口的可动面板。

2. 如权利要求 1 所述的空调机，其特征在于，在所述可动面板将吸入口开放的状态下，可动面板上端缘侧的吸入口的间隙被设定成比可动面板下端缘侧的吸入口的间隙较宽。

3. 如权利要求 1 和权利要求 2 中任一项所述的空调机，其特征在于，所述可动面板的吸入口开闭时的可动轨迹，被设定成描绘向上凸的圆弧的状态。

4. 如权利要求 1 所述的空调机，其特征在于，所述可动面板作成以一次按压操作而相对所述前面板可装拆自如。

5. 如权利要求 1 所述的空调机，其特征在于，在所述吹出口上设有向前后方向开闭自如地配设的多片上下百叶板，在本体内干燥运转时和在本体内杀菌运转时，使前侧的百叶板的前端部上方开放，使后端部与后方的百叶板前端部搭接。

6. 如权利要求 5 所述的空调机，其特征在于，具有控制装置，控制成：

---

在通常的空调运转开始时、在使所述吹出口的百叶板转动而将吹出口开放以前、突出驱动所述可动面板而将吸入口开放的状态。

7. 如权利要求 1 所述的空调机，其特征在于，具有控制装置，控制成：在通常的空调运转开始时、在使可动面板将吸入口开放规定量之后或经过规定时间之后、将所述送风机的速度切换提高。

8. 如权利要求 1 所述的空调机，其特征在于，具有控制装置，控制成：根据所述运转模式的切换，在可动面板将吸入口从开放状态变更为关闭状态时，进行嵌入，在可动面板受到指令将吸入口从关闭状态向开放状态变更时，优先进行可动面板的吸入口开放动作。

9. 如权利要求 1 所述的空调机，其特征在于，  
所述前面板开闭自如地安装在空调机本体上，  
具有检测该前面板是开放状态还是关闭状态的检测机构，  
并具有在利用该检测机构检测出前面板为关闭状态后受到开始运转指令时、控制成使可动面板回复至吸入口开放位置的控制装置。

## 空调机

### 技术领域

本发明涉及由室内机和室外机构成的空调机，尤其涉及具有室内机中吸入口的本体前面部结构。

### 背景技术

在由室内机和室外机构成的空调机的室内机中，在本体上具有吸入口和吹出口，在本体内部容纳着热交换器和送风机等。

另外，近来，存在着采用将从侧面看形成弯曲的前侧热交换器部和直状地倾斜的后侧热交换器部组合而形成大致倒V字状的热交换器的倾向。

在所述吹出口处设有上下风向变换百叶板，根据制冷运转与制暖运转的切换而能切换成向最适当的方向吹出。

与此相对，在吸入口处具有遮蔽本体内部的格栅和空气过滤器，当长期使用时，从本体内的间隙等侵入的尘埃附着堆积在热交换器上，或附着在送风机风扇上，或附着在送风通道及排水盘上。

另外，在制冷运转中，对于在使制冷运转停止时，在热交换器中冷凝的冷凝水不完全向室外排水，由于一部分成为仍附着在热交换器上、或残留在排水盘上，故本体内的湿度增高，结果，在作为构成零件的送风机风扇及热交换器等上面附着的尘埃中所含的杂菌及霉菌的繁殖更强。

因此，近来，在制冷运转结束后进行除湿运转的同时，从吹出口吹出的干燥空气直接与吸入口形成短路，使内部的构成设备干燥。然后，再进行从吹出口如所述那样引导而循环的本体内干燥运转，使其防止杂菌及霉菌的繁殖。

另外，正在研究的是，在具有将空气过滤器不能捕捉的尘埃进行捕捉、吸尘的吸尘机的室内机中，利用由吸尘机的放电电极所产生的臭氧，通过使臭氧充满于本体内部整体中，能可靠地将附着在内部的构成设备上的杂菌及霉菌予以灭菌、杀菌，能降低杂菌和霉菌的繁殖。

因此，虽然在研究用于有效地进行该短路的本体内干燥运转及利用臭氧的杀菌运转的室内机结构和控制装置，但还不能说已有足够效果。

本发明是鉴于所述情况而作成的，其目的在于，提供一种空调机，作成

从侧面看本体前面部相对形成大致倒 V 字状的热交换器为最适当的形状结构，可确保热交换空气的风量，能减少吸入气流在热交换器上的滞留区域、减少从前面部的运转噪音的泄漏，不仅在可动面板的开放时，即使在关闭时也能提高短路特性。

### 发明的概要

为了实现所述目的，本发明的第 1 技术方案具有：空调机本体；设在该空调机本体前面部上的吸入口和设在该吸入口的下部、设在吸入口的后方位置上的吹出口；覆盖所述吸入口地安装在所述空调机本体的前面部上、从侧面看前面部被弯曲形成的、且构成平滑曲面的前面板；形成大致倒 V 字状的热交换器，其具有在该空调机本体内与所述吸入口相对配置的、从侧面看弯曲形成的前侧热交换器部和从该前侧热交换器部的上侧向斜后方倾斜的直状的后侧热交换器部；配置在该热交换器的所述前侧热交换器部与所述后侧热交换器部之间的送风机；配置在所述吸入口与前侧热交换器部之间的、具有集尘功能和臭氧发生功能的吸尘机，所述前面板，具有在通常的空调运转时和在本体内干燥运转时被突出驱动而开放所述吸入口、在运转停止时和进行所述吸尘机的臭氧发生动作的本体内杀菌运转时被后退驱动而关闭吸入口的可动面板。

作为第 2 技术方案，在所述可动面板将吸入口开放的状态下，可动面板上端缘侧的吸入口的间隙被设定成比可动面板下端缘侧的吸入口的间隙较宽。

作为第 3 技术方案，所述可动面板的吸入口开闭时的可动轨迹，被设定成描绘向上凸的圆弧。

作为第 4 技术方案，所述可动面板构成以一次按压操作相对所述前面板可装拆自如的结构。

作为第 5 技术方案，在所述吹出口处设有向前后方向开闭自如地配设的多片上下百叶板，在本体内干燥运转时和在本体内杀菌运转时，使前侧的百叶板前端部上方开放，使后端部与后方的百叶板前端部搭接。

作为第 6 技术方案，具有控制装置，控制成：在通常的空调运转开始时，在使所述吹出口的百叶板转动而将吹出口开放以前、突出驱动所述可动面板而将吸入口开放。

作为第 7 技术方案，具有控制装置，控制成：在通常的空调运转开始时，在可动面板将吸入口开放规定量之后或经过规定时间之后、使所述送风机的速度切换提高。

作为第 8 技术方案，具有控制装置，控制成：根据所述运转模式的切换，在可动面板将吸入口从开放状态变更为关闭状态时，进行嵌入，在可动面板受到指令将吸入口从关闭状态向开放状态变更时，优先进行可动面板的吸入口开放动作。

作为第 9 技术方案，所述前面板开闭自如地安装在空调机本体上，具有检测该前面板是开放状态还是关闭状态的检测机构，并具有在利用该检测机构检测出前面板为关闭状态后受到开始运转指令时、控制成使可动面板回复至吸入口开放位置的控制装置。

通过采用解决这样问题的技术方案，作成从侧面看本体前部相对形成大致 V 字状的热交换器为最适当的形状结构，能确保热交换空气的风量，可减少吸入气流在热交换器上的滞留区域、减少从前面部的运转噪音的泄漏，不仅在可动面板的开放时，即使在关闭时也能提高短路特性。

#### 附图的简单说明

图 1 是表示本发明一实施形态的、构成空调机的室内机的概略剖视图。

图 2 是表示该实施形态的、卸下可动面板后的本体前部的概略立体图。

图 3 是表示该实施形态的、开闭驱动机构与图 2 不同的本体前部的概略立体图。

图 4 是表示该实施形态的、可动面板的背面侧的立体图。

图 5 是表示该实施形态的、可动面板开放时的室内机的概略剖视图。

图 6 是表示该实施形态的、可动面板开放时的室内机的概略剖视图。

图 7 是表示该实施形态的、可动面板开放时说明短路气流的示图。

图 8 是表示该实施形态的、可动面板关闭时说明短路气流的示图。

图 9 是表示该实施形态的、前面板开放后状态的立体图。

#### 发明的实施形态

以下，根据附图说明本发明的一实施形态。

图 1 模式表示构成空调机的室内机的剖面。

图中，1 是空调机本体，它从侧面看具有构成弯曲的前面部。上面部、下面部和左右两侧部，构成大致平板状。

在该空调机本体 1 的上面部设有上部吸入口 2，在前面部设有前部吸入口 3。在空调机本体 1 的前面部安装着前面板 4 以遮盖所述前部吸入口 3。

所述前面板 4 的中央部形成凹陷，该凹陷部分除周部外形成有开口。在前面板 4 的凹陷部分上，安装着由后述的开闭驱动机构 5 支承的可动面板 6，

构成自如地开闭作为开口的前部吸入口3。

所述可动面板6是嵌入前面板4的凹陷部分的状态，面板6、4相互呈一体地以规定的曲率弯曲成向跟前侧突出的状态。面板6、4相互的配合面为无台阶的同一曲面，并分别形成极平滑的面。

另外，除了空调机本体1的所述前面板4和所述可动面板6外，构成其他面部的面板也同样形成极平滑的面。

在空调机本体1上，沿前部吸入口3的下部，并在该吸入口的后方的位置上设有吹出口7。该吹出口7分别被另体的被转动控制的2片吹出百叶板8A、8B开闭自如。

在空调机本体1内配置着由前侧热交换器部9A和后侧热交换器部9B形成大致倒V字状的热交换器9。所述前侧热交换器部9A，在与前面板4和可动面板6之间留有间隙地大致平行地弯曲形成。后侧热交换器部9B以直状倾斜地与上部吸入口2相对。

在所述热交换器9的前侧热交换器部9A的前面侧安装有吸尘机10。该吸尘机10，在内部具有放电电极和作为接地电位的集尘电极，由产生较高的负的第1高电压和比其低的负的第2高电压的第1高电压电源向放电电极与集尘电极之间可分别切换地施加2个负的高电压。

在使吸尘机10进行原来的吸尘动作的场合，在放电电极与集尘电极之间施加第2高电压。另外，还能作为臭氧发生装置进行工作，在该场合，当在放电电极上施加第1高电压而进行放电时，产生臭氧。

也就是说，放电电极与集电电极之间的电位差，在产生臭氧时比吸尘动作时要大。另外，在使其作为吸尘机功能时和作为臭氧发生装置时，也可以在放电电压上施加相同的电压。

在所述热交换器9的前后侧热交换器部9A、9B的相互间配置与所述吹出口7相对的送风机11。该送风机11具有与热交换器9宽度方向尺寸大致相同的轴向尺寸，由与热交换器9相对配置的横流风扇和旋转驱动该横流风扇的风扇电动机构成。

所述前侧热交换器部9A的下端部载放于前排水盘12A上，后侧热交换器部9B的下端部载放于后排水盘12B上，接受分别来自热交换器部9A、9B滴下的冷凝水，可通过未图示的排水软管向外部排水。

另外，前后排水盘12A、12B的局部侧壁外面被设置在接近送风机11的位置，并用它们构成相对送风机11的风扇的喷嘴。

在构成喷嘴的前后排水盘12A、12B的侧壁部分和吹出口7的各边部之间用隔壁构件连接。用该隔壁构件13围住的空间，成为将喷嘴与吹出口7连通

的吹出通风道 14。

另一方面，与前部吸入口 3 和上部吸入口 2 相对，且在这些吸入口 3、2 与前部热交换器部 9A 和上部热交换器部 9B 之间安装着过滤器 15。该过滤器 15，从吹出口 7 上端开放的前面板 6 的下端插装，并根据需要可从相同部位自如地拆卸。

下面，对所述前面板 4、可动面板 6 和使可动面板 6 进退地驱动的开闭驱动机构 5 进行详述。

所述开闭驱动机构 5 由多组的连杆构件 20、连接这些连杆构件 20 的驱动轴 21、驱动该驱动轴 21 和在此未图示的驱动源构成。

多组的连杆构件 20 都安装在形成于前面板 4 凹陷部分的平坦部 1A 上。驱动轴 21 与连杆构件 20 一起被容纳在平坦部 1A 与将前部吸入口 3 关闭状态的可动面板 6 背面的极小空间中。

所述驱动源位于驱动轴 21 的一侧部，并被设在极靠近开闭吹出口 7 的吹出百叶板 8A、8B 的驱动源的位置的本体 1 的部位，使电气布线通用化，并使布线作业简单化。

图 2 和图 3 分别表示卸下可动面板 6 后状态的前面板 4 和空调机本体 1、安装在前面板 4 上的开闭驱动机构 5 的一部分的立体图。

并且，图 2 表示未图示的可动面板 6 关闭前面板 4 的开口部的状态、即表示关闭前部吸入口 3 时的开闭驱动机构 5，图 3 表示未图示的可动面板 6 将前面板 4 的开口部开放的状态、即表示将前部吸入口 3 开放时的开闭驱动机构 5。

在所述前面板 4 上，在左右两侧的平坦部 1A 和大致中央的平坦部 1A 上安装有构成开闭驱动机构 5 的连杆构件 20。多组的连杆构件 20，利用水平方向设置的 1 根所述驱动轴 21 进行连接。

驱动轴 21 的左侧端部从连杆构件 20 向外方突出，在与该端部相对的空调机本体 1 的部位上，虽未详细图示，但安装有由作为驱动源的驱动电动机和将该驱动电动机的驱动力向所述驱动轴传递的机构所构成的驱动源 22。

由于作成这样的结构，当向所述驱动源 22 通电并将驱动力向驱动轴 21 传递时，多组的连杆构件 20 被设定成同时作相同动作的状态。

而且，各连杆构件 20 具有一端部被嵌装于所述驱动轴 21 的上部侧连杆 23A 和一端部与上部侧连杆 23A 机械连接的下部侧连杆 23B。作为机械的连接装置，例如分别设有齿轮部并相互啮合。

上部侧连杆 23A 的全长与下部侧连杆 23B 相比形成得较长，并在各自的连杆的基端部上绕装着省略详细部位的扭簧。利用该扭簧，对上、下部侧连

杆 23A、23B 的前端部向与平坦部 1A 抵接的方向弹性地施加推压力。

在图 2 中，表示利用扭簧的弹力使上下部侧连杆 23A、23B 整体地与平坦部 1A 抵接的状态，在图 3 中，表示上下部侧连杆 23A、23B 克服扭簧的弹力而突出的状态。

图 4 是用于说明所述开闭驱动机构 5 的、可动面板 6 背面侧的立体图。

上下部侧连杆 23A、23B 的基端部从两侧被连杆罩 20a 夹入。被所述连杆罩 20a 夹入的各连杆 23A、23B 的基端部如上所述被机械地连接。

因此，贯通驱动轴 21 的上部侧连杆 23A 是驱动侧连杆，下部侧连杆 23B 成为从动侧连杆。上下部侧连杆 23A、23B 的相互转动角度被设定成相对平坦部 1A 大致构成相同的状态。

相互的连杆 23A、23B 的前端部在厚度方向形成两股状，在它们的内侧一体地突设有销部。在该两股状的端部间，插入有设在可动面板 6 背面侧的卡合构件 28A、28B，且所述销部与设在卡合构件 28A、28B 上的孔部卡合。

设在上部侧卡合构件 28A 上的孔部是圆孔，转动自如地支承上部侧连杆 23A 的销部。另一方面，设在下部侧卡合构件 28B 上的孔部是长孔，在长孔中转动自如且移动自如地支承着下部侧连杆 23B 的销部。

由于在任一个连杆 23A、23B 的前端部都形成两股状，故若将两股部向外方打开，设在其内侧的销部就可从设在卡合构件 28A、28B 上的孔部拔出。

也就是说，可较容易地将可动面板 6 从前面板 4 卸下，另外，也能较容易地将临时卸下的可动面板 6 再组装在前面板 4 上。

作为这样构成的空调机的室内机，再如图 1 所示，在停止时可动面板 6 关闭前部吸入口 3，尘埃就不会从该吸入口侵入空调机本体 1 的内部。吹出口 7 也利用 2 片吹出百叶板 8A、8B 进行关闭。

当将遥控器的运转开关切换成 ON 时，如后述那样开闭驱动机构 5 工作而所述可动面板 6 向跟前侧突出地移动，使前部吸入口 3 开放。

也就是说，在可动面板 6 关闭前部吸入口 3 时的开闭驱动机构 5 中，构成连杆构件 20 的上部侧连杆 23A 与下部侧连杆 23B 呈垂直状，可见恰如 1 根直状连杆的状态。

这时，下部侧连杆 23B 的销部，与由下部侧卡合部 28B 的长孔构成的孔部的最下部卡合。各卡合构件 28A、28B 被拉至最靠近本体 1 侧，具有这些卡合构件 28A、28B 的可动面板 6 完全地关闭前部吸入口 3。

与空调开始运转的同时，开闭驱动机构 5 的驱动源 22 使驱动轴 21 向图 1、图 2 中的逆时针旋转方向转动驱动。上部侧连杆 23A 与下部侧连杆 23B 由于机械地进行连接，故可克服扭簧的弹力，从而使其前端部向前方突出地转动。

通过使驱动轴转动规定量，驱动源 22 停止。上下部侧连杆 23A、23B 的各自上下端部向互相接近的方向转动，如图 3 所示，成为大致八字状。

可动面板 6 通过各连杆 23A、23B 与卡合构件 28A、28B 向前方突出地移动而使前部吸入口 3 开放。在该状态下，下部侧连杆 23B 的销部与下部侧卡合构件 28B 的长孔的上端卡合。

图 5 是可动面板 6 使前部吸入口 3 开放后状态的纵剖视图，图 6 是相同状态的室内机的侧视图。

图 6 中虽未图示，但吹出口 7 所具有的吹出百叶板 8A、8B 根据制冷运转与制暖运转的切换设定而转动规定量。送风机是构成送风作用的一方，驱动室外机的压缩机并使制冷循环运转开始。

室内空气从上部吸入口 2 和前部吸入口 3 被引入空调机本体 1 内而通过空气过滤器 15。室内空气中所含的尘埃被空气过滤器 15 捕捉，在除去尘埃的状态下，通过热交换器 9 而进行热交换作用。

该热交换空气沿吹出通风通道被引导，从吹出口 7 引向吹出百叶板 8A、8B 而向室内吹出，能高效地进行空调运转。

因所述吸尘机的作用，将未被空气过滤器 15 捕捉的尘埃完全地捕捉。因此，净化后的空气通过热交换器 9 而从吹出口 7 向室内吹出。

这样，尤其对于从侧面看形成大致倒 V 字状的热交换器 9，能获得安装在空调机本体 1 的前面板上的前面板 4 和构成该前面板 4 的一部分的可动面板 6 的最适当的形状结构。

因此，能降低热交换器 9 的阻风音、降低送风机 11 风扇的送风音向前方的泄漏而获得舒适的空调。能确保风量、可减少向热交换器 9 的吸入气流的滞留区域、并能提高热交换效率和空调性能。

如图 5 记载的那样，在可动面板 6 使前部吸入口 3 完全开放的状态下，可动面板 6 上端缘侧的前部吸入口 3 的间隙 Sa 被设定成比可动面板 6 下端缘侧的间隙 Sb 较大 ( $Sa > Sb$ )。

通常，室内机被安装在居室壁面上靠近天花板的高处，居住者从下方往上方基本能看到室内机。在这样的条件下，由于可动面板 6 在 ( $Sa > Sb$ ) 的状态下与前面板 4 之间留有间隙，居住者可看到可动面板 6 几乎不移动的状态，故没有不适感且外观较好。

不仅如此，因确保来自上部间隙 Sa 的气流，对于与上部间隙相面对地配置的吸尘机 10 气流就容易通过，故能提高吸尘机的集尘效率。

当为使空调运转结束而将遥控器的运转开关设为 OFF 时，压缩机、送风机 11 和吸尘机 10 的运转停止，且开闭驱动机构 5 使可动面板 6 后退移动并

将前部吸入口 3 关闭。

所述开闭驱动机构 5，使驱动轴 21 向反方向转动，由于下部侧连杆 23B 的销部在卡合构件 28B 的孔部（长孔）中移动，故该卡合构件 28B 被提起。

而且，由于上下部侧连杆 23A、23B 的全长不同，前部吸入口 3 的开放量与相对上下卡合构件 28A、28B 和前面板 6 上下部的移动量成正比，终于将前部吸入口 3 关闭。

因此，在该室内机中，能利用可动面板 6 将前部吸入口 3 开闭，在运转停止时将前部吸入口 3 完全关闭，阻止尘埃向本体 1 内部侵入，不发生各种不良情况。

从可动面板 6 的前部吸入口 3 的关闭状态至开放状态的轨迹和从开放状态至关闭状态的轨迹，从所述开闭驱动机构 5 的结构来看，成为图 6 中用点划线所示的状态。

这里虽表示可动面板 6 上端的可动轨迹，但整体上作成大致同样的形状，形成描绘向上凸的圆弧状态。即，由于是向上凸的曲线，故存在顶点 p。

在任何的情况下，开闭驱动机构 5 在开闭途中停止时，可动面板 6 的上端部若位于从顶点 p 处于前面板 4 侧，可动面板 6 因自重而自然地向关闭前部吸入口 3 的方向移动，终于成为关闭状态。

另外，可动面板 6 在从吸入口 3 的开放状态向关闭状态移动的途中从越过顶点 p 的位置，因可动面板 6 受到的自重而使开闭驱动机构 5 的动作变得圆滑，迅速成为关闭状态。

反之，开闭驱动机构 5 在开闭途中停止时，可动面板 6 的上端部若位于从顶点 p 处于跟前侧，可动面板 6 因自重而自然地向使前部吸入口 3 开放的方向移动，终于成为开放状态。

另外，可动面板 6 在从吸入口 3 的关闭状态向开放状态移动的途中从越过顶点 p 的位置，因可动面板 6 受到的自重而使开闭驱动机构 5 的动作变得圆滑，迅速地成为开放状态。

即使作成任何状态，都形成将可动面板 6 在开闭时的可动轨迹描绘向上凸的圆弧，当使其存在顶点 p 时，可动面板 6 的开闭动作变得圆滑且可靠，能确保可靠性。

在该室内机中，可容易地形成以下 2 通道的短路气流。

第 1，如图 7 所示，为本体的干燥运转。

也就是说，在制冷运转结束后使开闭驱动机构 5 动作，使可动面板 6 呈开放状态。将前侧的吹出百叶板 8A 作成水平方向、或作成比其以上的向上方向，使后侧的吹出百叶板 8B 关闭。

但是，前侧吹出百叶板 8A 仅向前端部转动，后端部成为与后侧百叶板 8B 的前端部搭接。由此，从吹出口 7 吹出的空气成为仅在前侧吹出百叶板 8A 的前端部与吹出口的前端部之间，且能集中地吹出。

另外，将在构成热交换器 9 的前侧热交换器部 9A 与后侧热交换器部 9B 之间的双通阀节流而作成除湿状态，开始制冷循环运转并驱动送风机 11。该场合，吸尘机进行集尘动作。

前侧热交换器部 9A 成为冷凝器（再热器）、后侧热交换器部 9B 作为蒸发器产生作用，干燥后的空气被导向吹出通道 14，再从吹出口 7 吹出。

由于前侧的吹出百叶板 8A 的风向被设定，故从吹出口 7 吹出的干燥空气从前面板 4 的下部沿向上方流动。由于可动面板 6 从前面板 4 突出，故干燥空气在可动面板 6 与前面板 4 之间被引导，从前部吸入口 3 吸入至空调机体 1 内。

干燥空气用过滤器 15 除去尘埃，再用吸尘机 10 除去剩余的尘埃。而且，如所述那样，被引导至热交换器 9 进行干燥，从吹出口 7 向前部吸入口 3 作成短路。

尤其，当进行制冷运转时，由热交换器 9 冷凝后的冷凝水产生蒸发，使本体 1 内高湿度化。因此，在进行除湿运转的同时，使干燥空气从吹出口 7 直接与前部吸入口 3 作成短路，使其在本体内循环。

本体 1 内部的水分迅速地蒸发，使本体 1 内干燥。由此，内部的构成设备迅速地干燥而抑制杂菌及霉菌的繁殖。蒸发后的水分通过短路而在后侧热交换器部（蒸发器）9B 中冷凝，成为冷凝水被回收。

另外，前面板 4 和可动面板 6 从侧面看被弯曲形成，构成相互无凹凸的平坦的曲面，由于前部吸入口 3 位于吹出口 7 的前方，故短路气流极圆滑地流动，成为短路特性良好、在居住区域能不出风地进行除湿。

第 2，如图 8 所示，是可以在每规定期间进行的、本体内的杀菌运转。

这时，可动面板 6 保持关闭状态，将前侧吹出百叶板 8A 设定在所述的位置上。因此，就能集中吹出。不进行制冷循环地驱动送风机 11。

而且，吸尘机 10 设成 ON 状态地进行臭氧发生动作。即，向吸尘机 10 中的放电电极上施加第 1 高电压而进行放电，能产生臭氧。

从吹出口 7 吹出的空气，沿前面板 4 和可动面板 6 的曲面圆滑地流动，到达本体 1 的上面。在本体 1 上面的上部吸入口 2 中，产生因送风机 11 的吸引引起的负压，引导至此处的空气被吸入本体 1 内。

虽然仅通过热交换器 9，但随着由吸尘机 10 的臭氧发生动作所产生的臭氧含于流动空气中。流动空气充满于本体 1 内，且流通至各个角落后从吹出

口 7 吹出，且与上部吸入口 2 构成短路。

在容纳于本体内的送风机 11 的风扇及热交换器 9 上即使附着杂菌及霉菌，也由于使含有臭氧的空气循环流通，故能对杂菌及霉菌进行杀菌或灭菌，阻止它们的繁殖。

如所述那样，前面板 4 和可动面板 6 从侧面看被弯曲形成，各自的面板被形成整个都无凹凸的平滑的曲面。另外，前部吸入口 3 位于吹出口 7 的前方，在上部吸入口 2 上作用着负压。

从这样的结构中，吹出口 7 吹出的空气，从前面板 4 和可动面板 6 的下部沿着向上，利用所谓的附壁效应圆滑地流动，在途中无风量的损失，短路特性好。

所述可动面板 6，通过开闭驱动机构 5 安装在前面板 4 上，但实际的连接仅是前面板 4 侧的连杆构件 23A、23B 的销部与可动面板 6 侧的卡合构件 28A、28B 孔部的卡合。

因此，可动面板 6 用 1 次按压操作就可以从前面板 4 上自如地装拆，污垢的揩除作业可容易地进行。而且，由于可动面板 6 与前面板 4 一起作成无凹凸的平坦的曲面，故污垢难以附着，污垢的揩除容易进行，始终能保持起初的漂亮的外观。

仅如图 1 所示，在空调机本体 1 内具有的控制部（控制装置）30 进行下述那样的控制。

在制冷、制暖、除湿等通常的空调运转开始时，在使吹出百叶板 8A、8B 转动并使吹出口 7 开放以前，控制成使开闭驱动机构 5 动作并使可动面板 6 突出，使前部吸入口 3 开放。

然后，驱动送风机 11 进行送风作用，但由于已使可动面板 6 突出，故没有随着送风机 11 的驱动的负压引起的可动面板 6 开放动作的不良情况，能获得高的可靠性。

另外，在通常的空调运转开始时，在可动面板 6 将吸入口 3 开放规定量后、或经过规定时间后，控制成使送风机 11 的速度切换提高。

即，没有因随着送风机 11 的驱动的负压引起的可动面板 6 开放动作的不良情况，能获得高的可靠性。

另外，根据运转模式的切换，在可动面板 6 将吸入口 3 从开放状态变更成关闭状态时，进行嵌入，而在可动面板 6 受到将吸入口 3 从关闭状态变更成开放状态的指令时，控制成使可动面板 6 的吸入口 3 的开放动作优先进行的状态。

这样，即使有突然的嵌入，由于使可动面板 6 的开放动作优先进行，就

没有因随着送风机 11 的驱动的负压引起的可动面板 6 的开放动作的不良情况，能获得高的可靠性。

另一方面，为了除去在过滤器 15 上附着的尘埃，必需将过滤器卸下。或在不使用遥控器的状态下也有将安装在本体 1 上的强制运转开关设成 ON 而开始强制运转的情况。

因此，如图 9 所示，将前面板 4 相对本体 1 安装成开闭自如，还在本体 1 的前面部上，安装着检测前面板 4 是开放状态还是关闭状态的检测机构 16 和强制运转开关 17。

检测机构 16 在检测前面板 4 的开放状态中，即使将遥控器的运转开关或安装在本体 1 上的强制运转开关 17 设成 ON，也不会开始运转。

使用者关闭前面板 4，通过检测机构对其进行检测，开始进行运转。这时，使用者如图所示，在保持关闭可动面板 6 的状态下即使关闭前面板 4，控制部也将可动面板 6 控制成回复至吸入口 3 开放的状态。

然后，由于驱动所述送风机 11 产生送风作用，故没有随着驱动送风机 11 的负压引起的可动面板 6 开放动作的不良情况，可获得高的可靠性。

如所述说明那样采用本发明，作成从侧面看本体前面部相对形成大致倒 V 字状的热交换器为最适当的形状结构，能确保热交换空气的风量，能减少吸入气流在热交换器的滞留区域、减少从前面部的运转噪音的泄漏，不仅在可动面板的开放时，即使在关闭时也能获得提高短路特性的效果。

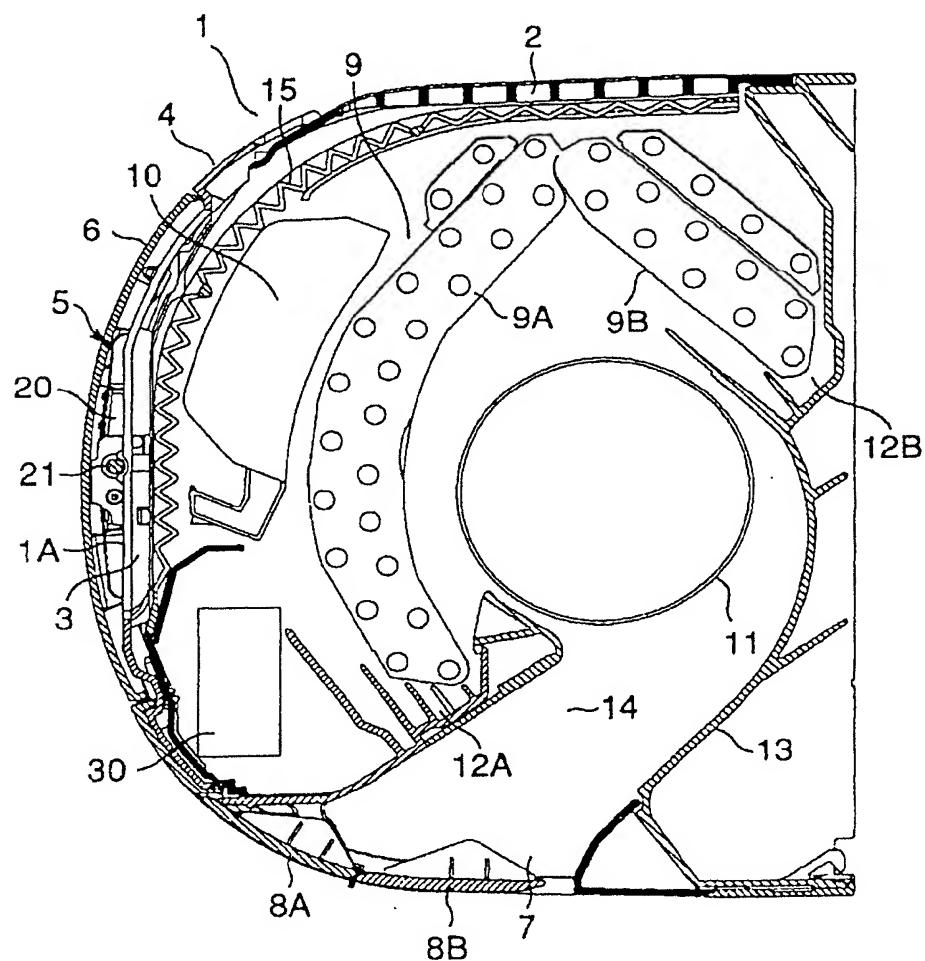


图 1

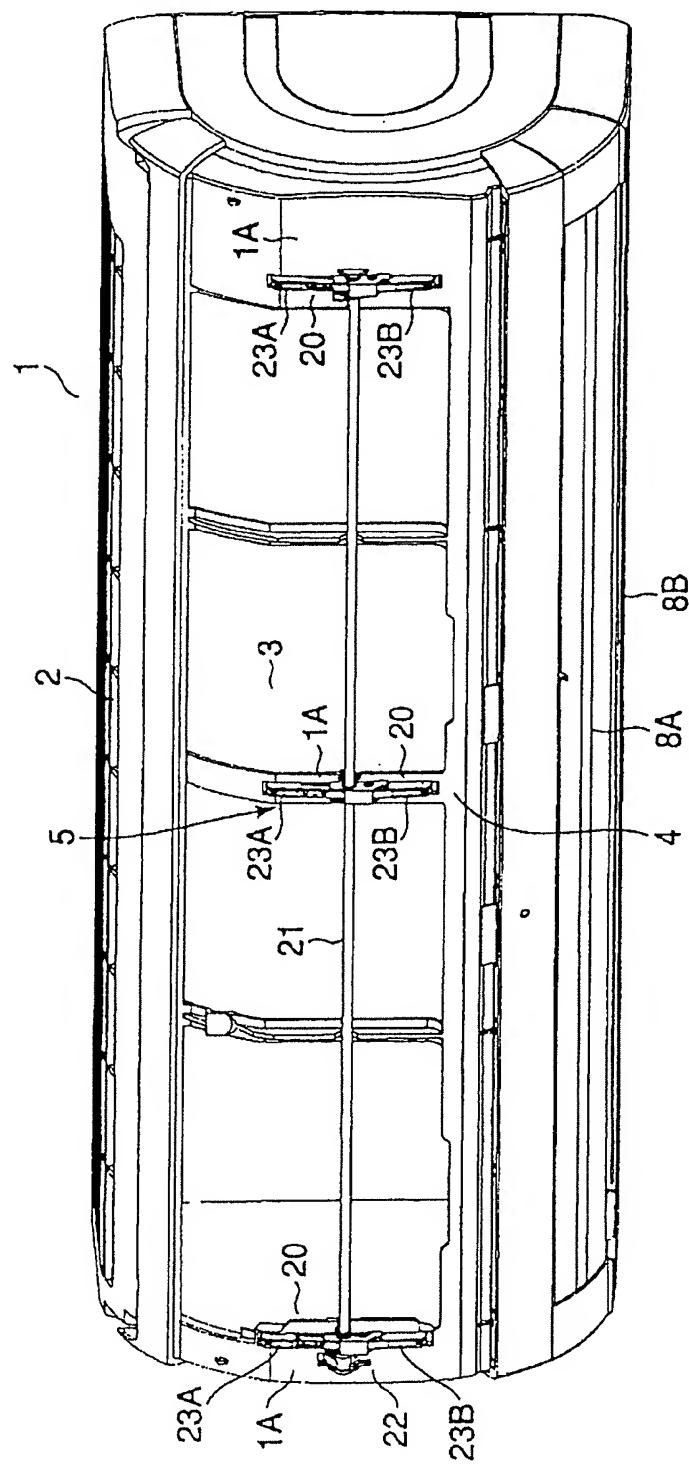


图 2

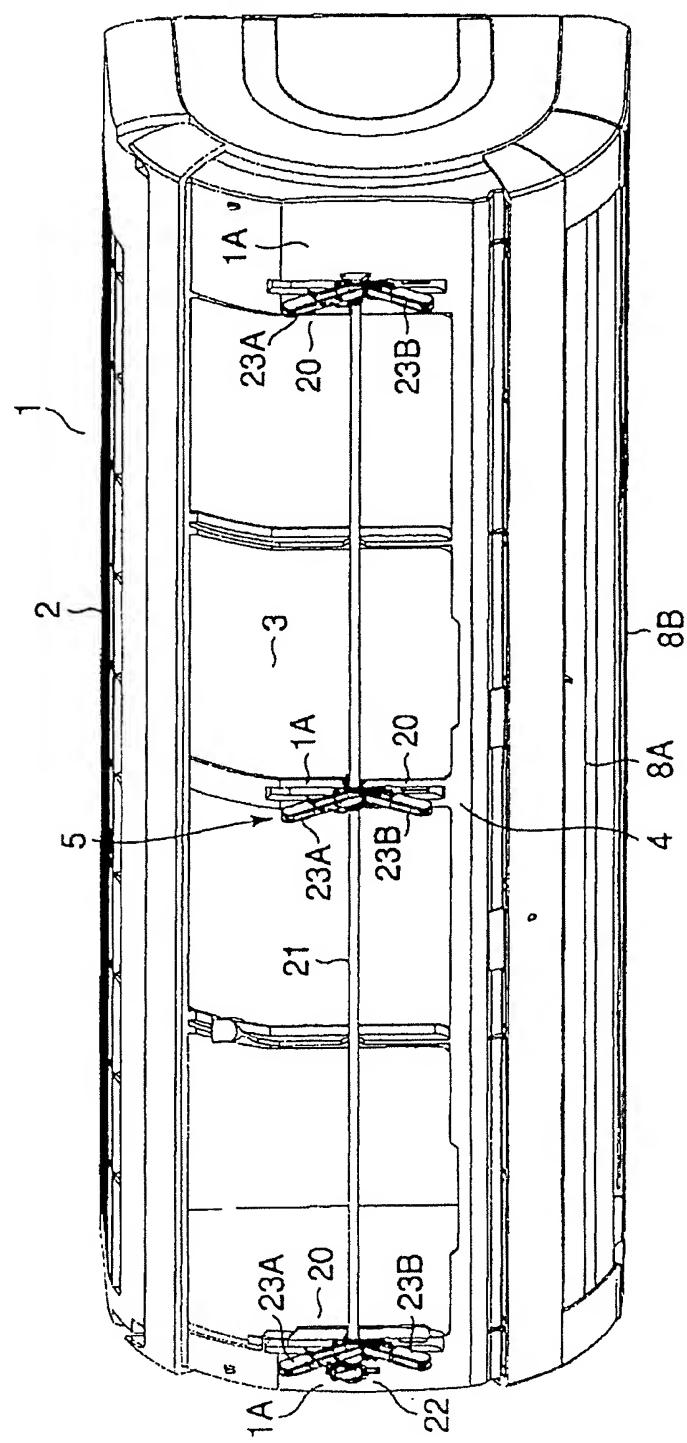
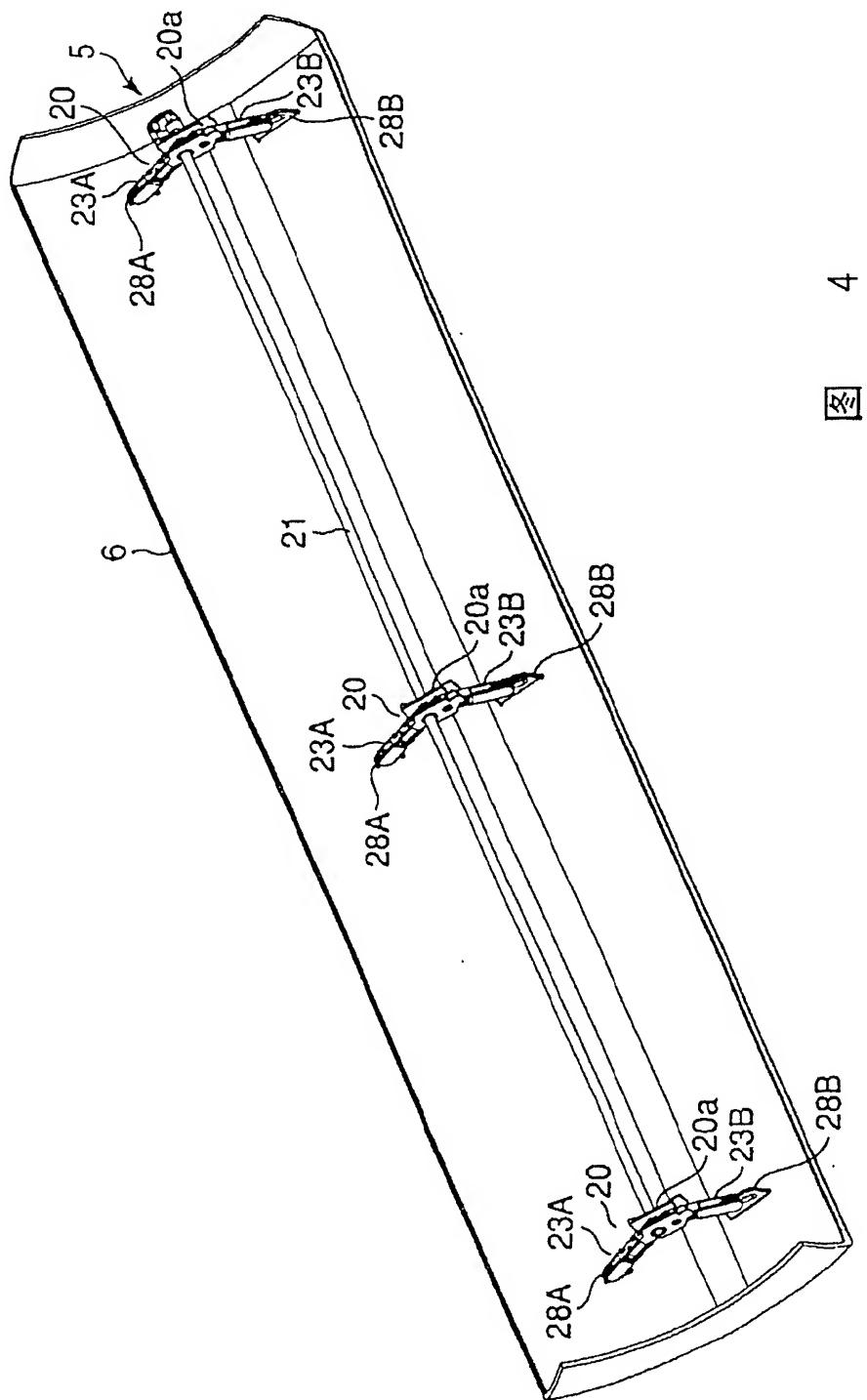


图 3



4

图

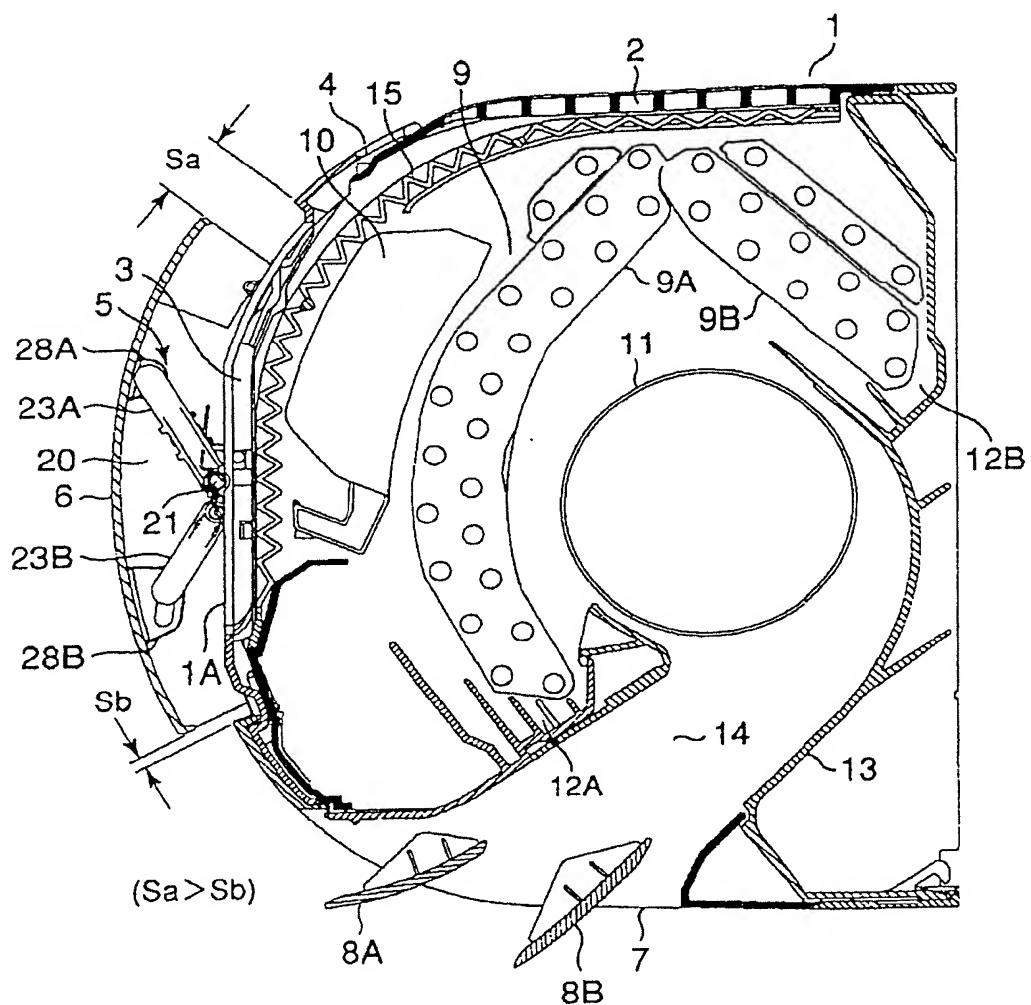


图 5

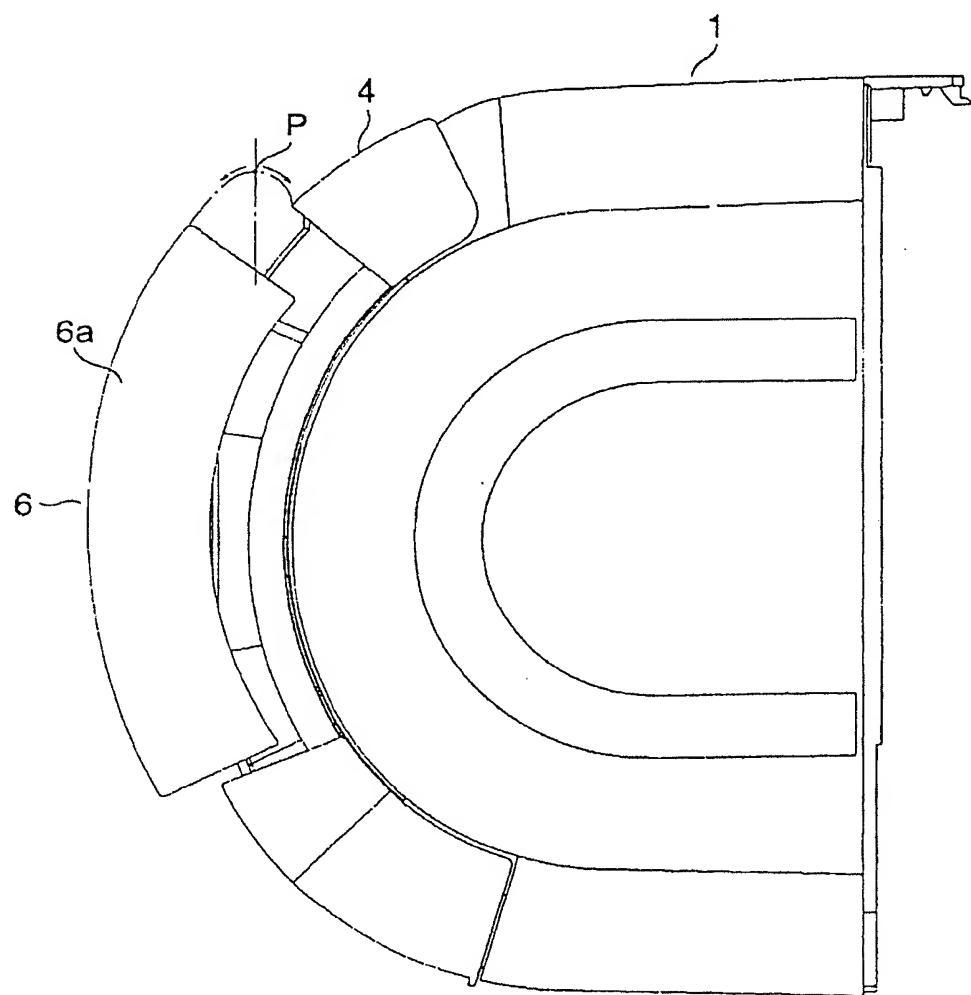


图 6

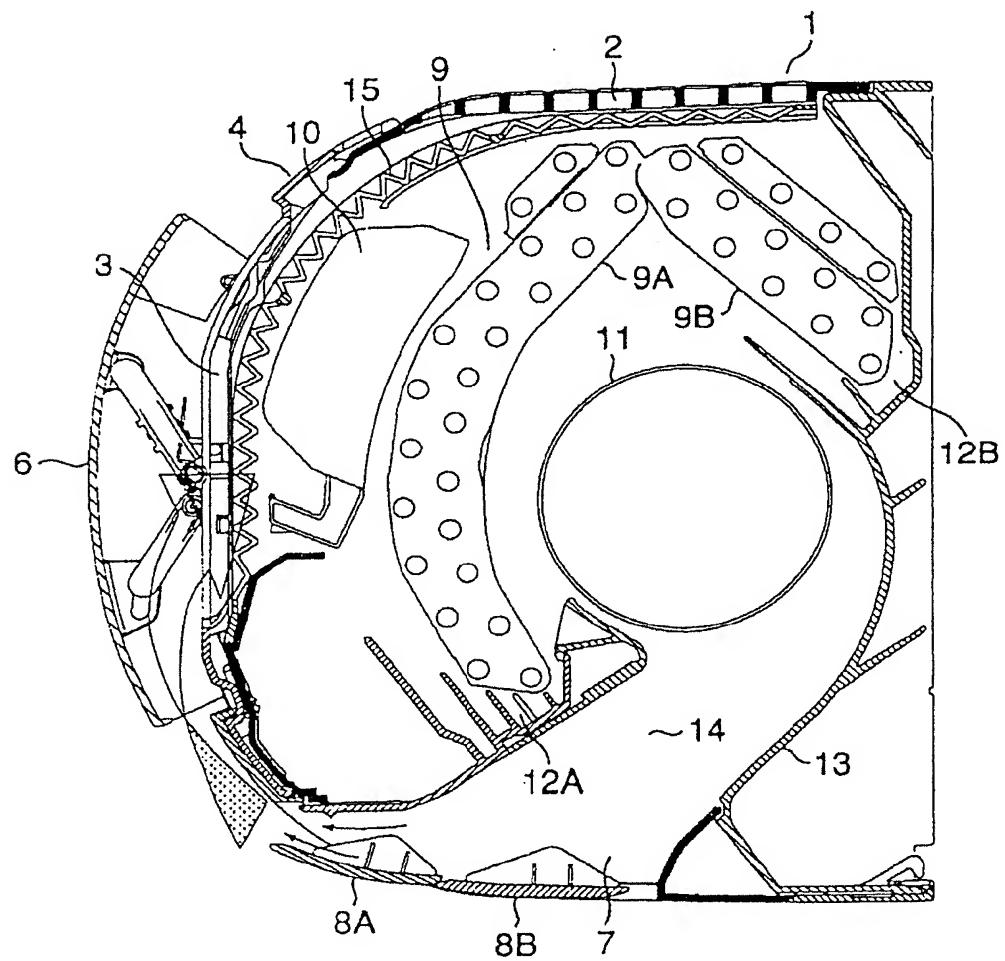


图 7

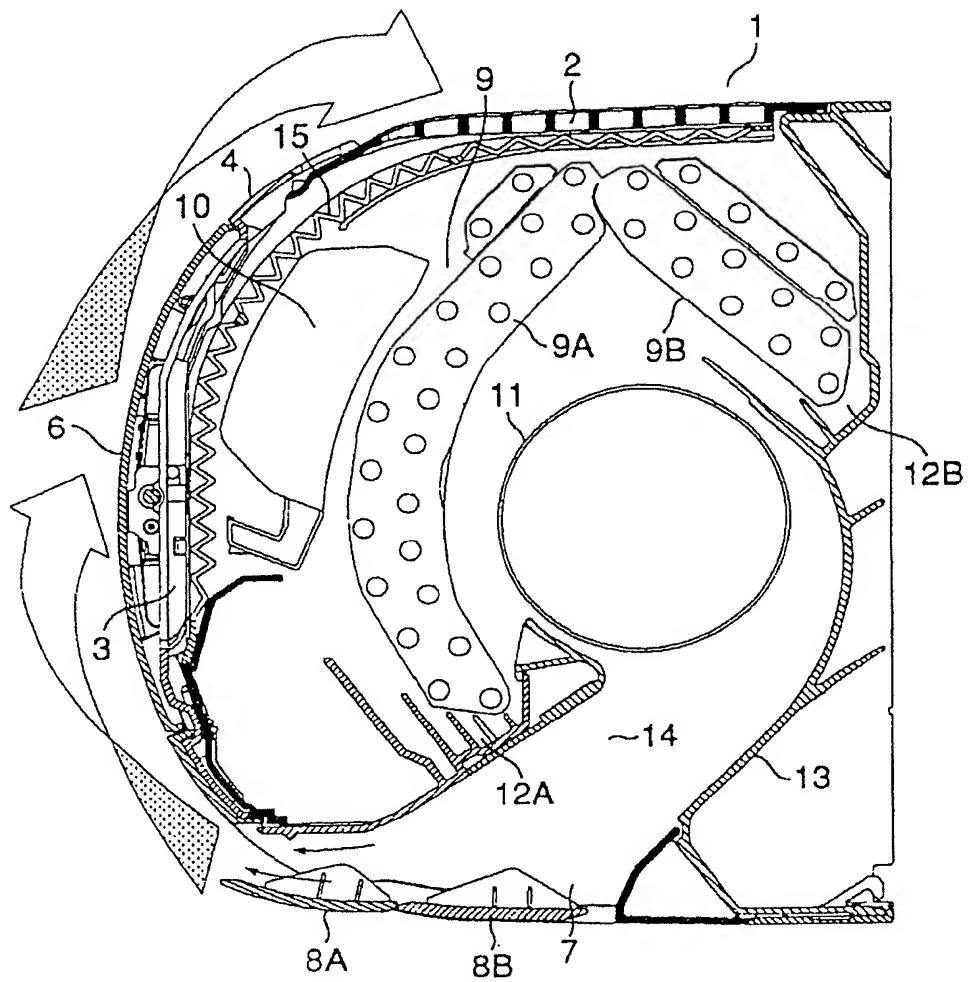


图 8

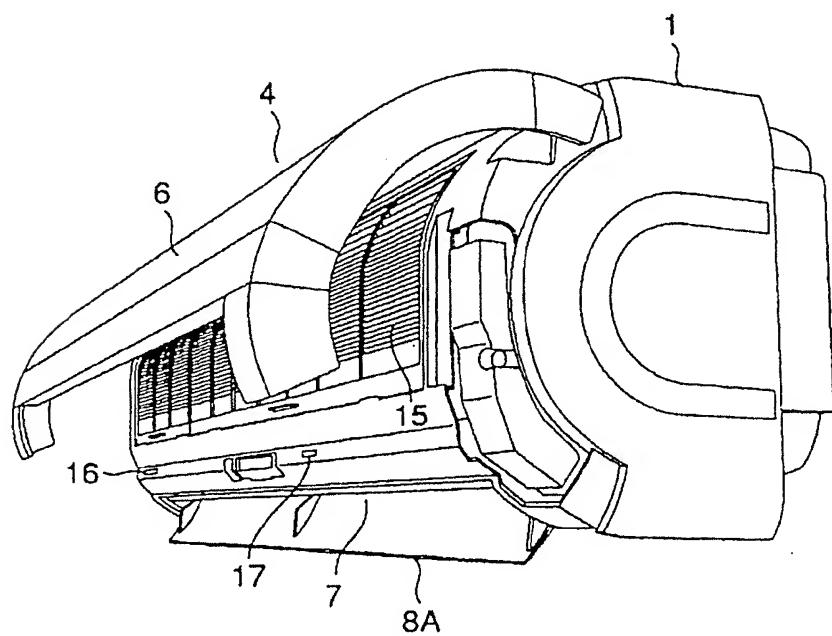


图 9